A
FIZIKAI INTÉZET
és az
ATOMKI
közös
SZEMINÁRIUMA

CLAUDIU GENES

MAX PLANCK RESEARCH GROUP LEADER
MAX-PLANCK-INSTITUT FÜR DIE PHYSIK DES LICHTS

Quantum optics with molecules

címmel előadást tart

2022. március 21-én,
hétfőn
14:00 órakor

az

E7-es szemináriumi teremben
(Bem tér 18/B., I. emelet jobbra)

Az előadás kivonata:
Coherent light, either classical or quantum, as in the case of optical cavities, has the power to strongly modify and eventually enhance material properties. Different competing theoretical approaches are currently emerging to describe photon-electron interactions in the presence of vibronic coupling. I discuss progress we have recently made in developing a quantum Langevin equations approach to quantum optics with molecules. At the level of a single or a few molecules, this method can analytically describe effects such as polariton cross-talk, Purcell modification of branching ratio and incoherent FRET (Förster resonance energy transfer) migration of energy [1,3]. In the mesoscopic limit, where many molecules are coupled to a single cavity mode, I discuss strategies for incorporating frequency and orientational disorder, near field couplings and vibrational relaxation in an analytical model showing the degradation of the VRS (Vacuum Rabi splitting) at high densities [2].

References
[1] M. Reitz, C. Sommer and C. Genes, Langevin approach to quantum optics with molecules, Phys. Rev. Lett. 122, 203602 (2019).

[2] M. Reitz, C. Sommer, F, Mineo and C. Genes, Molecular polaritonics in dense mesoscopic disordered ensembles, Phys. Rev. Research 3, 033141 (2021) .

[3] M. Reitz, C. Sommer and C. Genes, Cooperative quantum phenomena in light-matter platforms, PRX Quantum 3, 010201 (2022)